9 • URBAN DESIGN

The main instrument for implementing urban design is a city or county General Plan, and the main tool within a General Plan is providing guidance on land use by specifying what can happen and where. The nature of a watershed system is largely determined by the way water moves through and interacts with the land, which leads to certain hydrologic outcomes within the four water resource areas (flood management, water quality, water supply and habitat). Therefore, land-use decisions have a big impact on the way a watershed functions hydrologically.

Up to this point, the hydrologic function of a community has not been considered an urban planning issue. To remedy this, hydrologic considerations can be considered within each of the mandatory elements in a General Plan. The underlying watershed processes and their locations, can be included as part of standard land use analysis. For example, when locating parks and open spaces, strategic locations for functions such as stormwater capture or habitat connectivity would be considered. These latter issues have traditionally been the responsibility of public works departments, which generally do not make the land use decisions.

In order to help create a healthier in-stream hydrograph that in turn fosters wider scale water resource management and restoration, the way land is designed and used can be modified. For example, consider an objective of reducing stormwater and dry-weather runoff to predevelopment levels. A way to approach integration of hydrologic needs into land use design would be to begin with a specific water budget for the land in each of the jurisdiction's drainages. It would be based on the flow rates that the receiving streams would require in order to function in a natural condition. It would also be guided by the overall water budget developed for the regional water supply performance objective. Water budgets are already used as a standard design parameter for architects, landscape architects, engineers, and water managers; similar methods could be adopted by land use planners. A city could integrate land use changes at the regional, neighborhood and site scale so that a balanced water budget could be met over time.

9.1 Land Use Planning and Design Scale

Land use design occurs at regional, neighborhood and site scales. The following sections describe methods for integrating healthy watershed function into each scale, and discusses

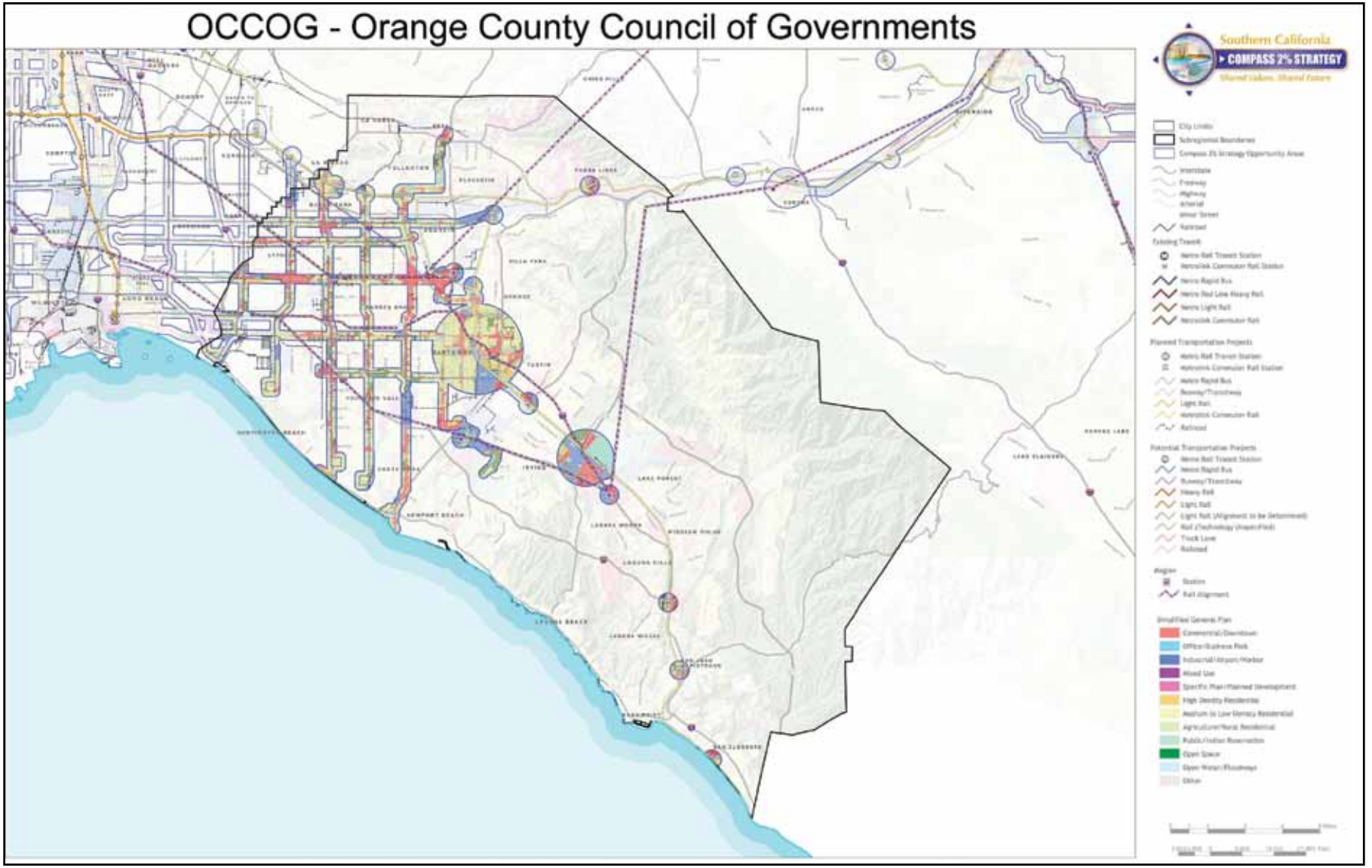

Figure 9.1 "Two Percent Strategy" Opportunity Areas from 2004 Compass Blueprint Growth Vision Report. (Source: Southern California Association of Governments & Orange County Council of Governments)

how these methods relate to the environmental, social and economic goals of this Plan.

Regional Scale

The Southern California Association of Governments (SCAG) expects the population in the Southern California region to grow by five million people over the next twenty-five years. Accommodating this population growth will require a significant amount of new development, infrastructure and resources. Existing infrastructure will also need rehabilitation and upgrades. Other challenges include freeway congestion, rising water demand and increasing energy costs. SCAG sponsored a regional study to identify ways to accommodate this population increase in the most resource efficient manner. The result of the study was a recommended strategy to condense future growth into the two percent of Southern California where investment in infrastructure would be the most cost effective. This would mean increasing urban density along the major transportation corridors in the region.

This kind of growth is called transit oriented development, or TOD. It places denser urban development around public transportation hubs in order to accommodate a larger population, reduce the need to drive private cars and relieve traffic on surface streets and freeways. Although this strategy was not originally designed as a strategy for addressing water resource concerns, centralization of development provides opportunities for implementing more effective water management strategies. Centralizing urban growth into dense hubs reduces watershed-wide impervious surface area. It increases opportunities for recycled water use and simplifies waste water and stormwater treatment. At the same time, it protects outlying areas, increases open space and allows for restoration of more natural habitats.

As described in Chapter 6 on the Desired State, additional mapping of the most important habitat corridors is needed. NROC and the Army Corps of Engineers have already identified potential wildlife corridor linkages in Central Orange County that would create more functional habitat corridors. The planning for increased development around transportation centers can be coordinated with planning for habitat linkage opportunities. In places, urbanization already encroaches on habitat corridors; for example, Buck Gully is isolated from other coastal canyons by Newport Coast Road and housing developments. In these cases, urban design parameters can be tailored to accommodate the special ecological needs of these areas. Additionally, local governments can use high ecological value areas to provide a theme and style for the community in order to highlight its uniqueness and sense of place. Engaging local community members to become stewards of these areas through active volunteer programs will help them become advocates and help offset special operations and maintenance needs that may be required. It is also an opportunity for local schools to learn about the natural sciences by using their own communities as a classroom.

Regional open space corridors primarily provide passive recreation opportunities because these corridors play such an important role in the health of native animal species. As feasible, a network of trails and greenbelts could connect to regional open spaces. This

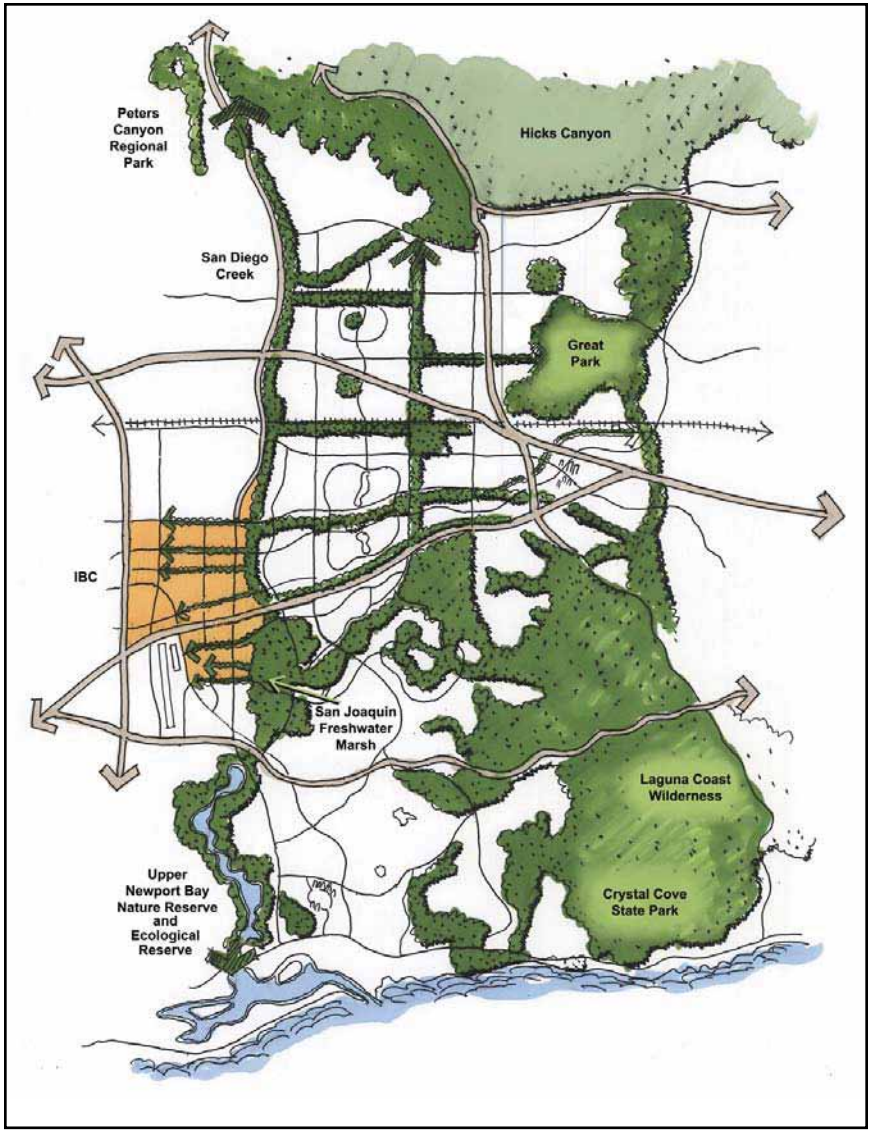

Figure 9.2 Open space connections – mountains to bay, Irvine. (Source: Irvine Business Complex Vision, 2006)

could help a balance urban density and opportunities for an active and healthy lifestyle. On a psychological level, walking and bicycle trails alleviate tension and reduce social anxiety levels. They also contribute to a dynamic visual aesthetic with interesting pathways connecting urban points of interest. At the same time, care must be taken to protect the most sensitive habitats from urban edge effects such as polluted runoff, litter, trampling, erosion from mountain bikes and ATVs, invasive weeds, soil compaction, fire, vandalism, noise and light pollution. An example of sensitive habitat is the endangered arroyo toad habitat located at the edges of certain riparian streams. Docent-led hikes and nature centers are one way to strike a balance between habitat protection and public access, while also increasing appreciation and enjoyment through education. At present, the Laguna Canyon Foundation and the Irvine Conservancy conduct such hikes in the NCCP Reserve areas.

Neighborhood Scale

A neighborhood is a relatively self-contained area with a relatively distinct character and identity within a larger city or town. It contains most of the services residents need on a daily basis such as stores, schools and businesses, as well as civic functions such as parks, a post office and fire stations. There are many different theories about what makes a neighborhood great, but one criticism of modern mass-produced development is that its uniformity has led to places with little distinction. This is a characteristic of 'sprawl', which has been the dominant form of urban development

since the end of World War II. Developing a sense of community and neighborhood character in these places requires implementing changes over time that interrupt the uniformity of density, style and function.

Advocates of neighborhood design argue that local character is important because it increases civic participation and social cohesion, and provides a design template that unifies and gives direction to any future development in that area. In the 1980s-90s there was a movement to return to more traditional urban templates for development that were thought to be more supportive of community experience and community needs. This movement produced urban design guidelines such as Smart Growth, Transit Oriented Development, Traditional Neighborhood Development, LEED for Neighborhood Development and New Urbanism.

As in this report, the New Urbanism approach identifies appropriate development strategies for the regional, neighborhood and site design scales. The Charter of the New Urbanism states that, "A range of parks, from tot-lots and village greens to ball fields and community gardens, can be distributed within neighborhoods. Conservation areas and open lands can be used to define and connect different neighborhoods and districts". The habitat corridors discussed as part of the regional scale help define urban areas by creating a spatial distinction among them. Currently, most urban parks and open spaces are isolated from each other, serving only recreational purposes. If these spaces can be connected to

Figure 9.3 Bike path along San Diego Creek, Woodbridge, Irvine.

Figure 9.4 Peters Canyon Regional Park Trail (Source: USACE San Diego Creek Study, 2000)

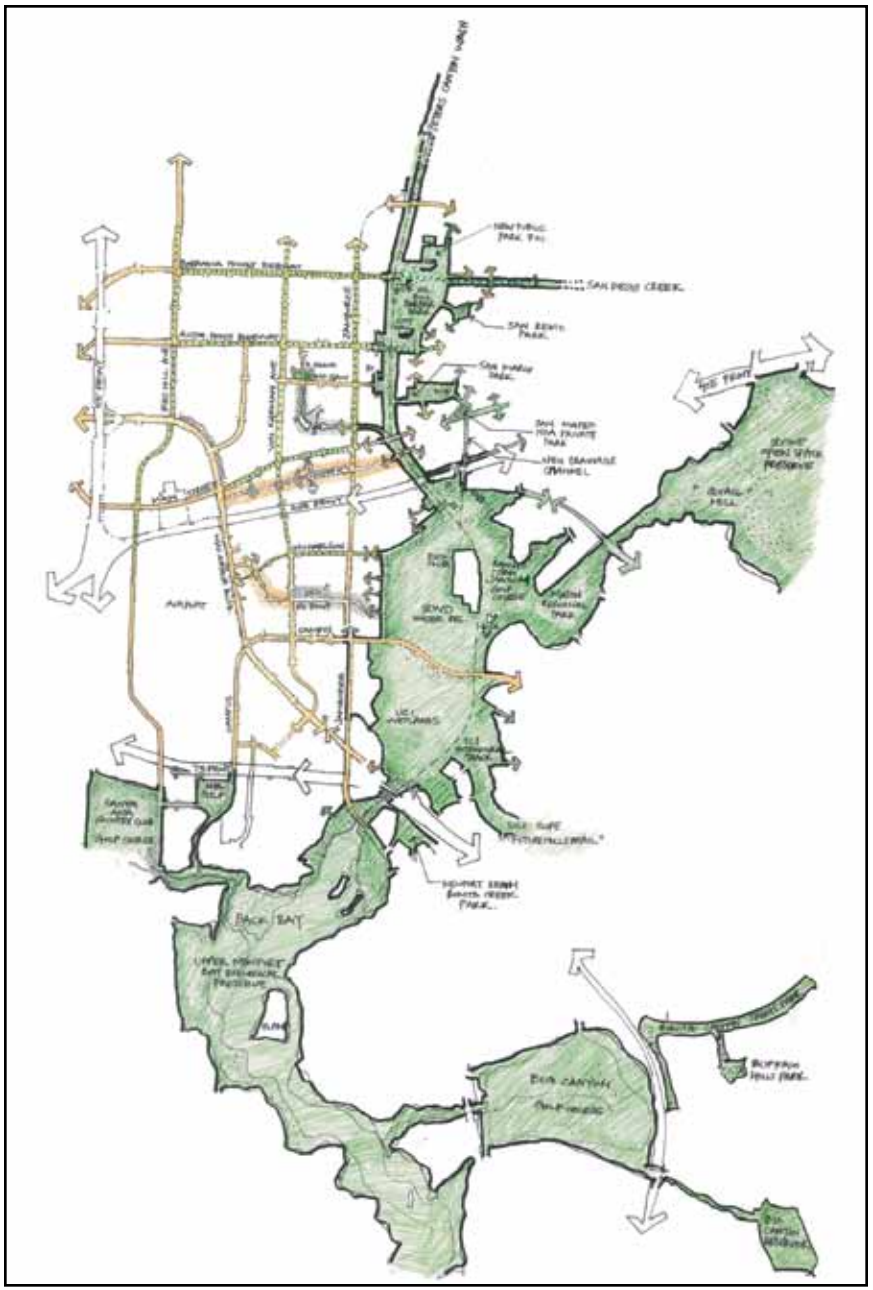

Figure 9.5 Open space connections near Irvine Business Complex. (Source: IBC Vision Plan, City of Irvine, 2000)

accommodate both human use and natural functions, it would open up a wide range of new funding sources from organizations and agencies that financially support the improvement of hydrological and ecological systems. There are many opportunities for connecting isolated open spaces around Newport Bay and Newport Coast. One caveat to consider when designing such corridors is that care must be taken not to create mortality sinks for wildlife through close proximity to roads, pet cats or dogs off-leash. Other potential edge effects should also be controlled, such as noise and light pollution, vandalism, fuel modification "brush clearing" regimes, polluted runoff, litter and erosion.

This IRCWMP does not include a detailed urban planning analysis of open space locations. Subsequent iterations of this Plan will look into this as a way to bridge the gap between the natural and the man-made environments. Bringing urban design into this process will enable a greater degree of mutual benefit between the social, economic and environmental interests of this region. First, a spatial analysis of public open spaces throughout Central Orange County could identify neighborhoods that currently do not have an active urban park within walking distance. In neighborhoods that do not have parks, creating one could become a planning priority for the long-term economic and social well-being of that community and its residents. Next, existing or planned urban parks could be evaluated for opportunities to implement stormwater, water supply, water quality and/or habitat improvements.

One objective could be to connect all urban parks by a system of trails and, in doing so, link neighborhoods together through open spaces to form a more cohesive region. This way, large regional open spaces would separate and define communities spatially, but urban open spaces and trail corridors would functionally connect them. Although urban open spaces may be less suitable for habitat because of urban pressures that would be dangerous to some animal communities, at a minimum, urban open space areas can bolster habitat function by using locally native landscaping. The Orange County Parks Strategic Plan, completed in 2007, includes nine strategic goals (See Appendix I.) that complement this IRCWMP and, over time, these plans can be more fully integrated.

Furthermore, many public parks, open spaces and greenbelts could be redesigned to serve important hydrologic functions, such as stormwater capture, treatment, reuse and/or infiltration where appropriate. For instance, they could handle runoff from higher density areas, such as high-density transit oriented developments, that do not have the space for on-site stormwater management. Such environmental services are important to the communities that live adjacent to the parks and greenbelts and also to natural and urban communities further away.

Parks and greenways contribute to economic development goals because they add economic value to urban land and establish community value in a balanced, pedestrian-scale development. To maintain a neighborhood scale water budget, local agencies can use Redevelopment Project Area Master Plans to balance high density mixed-use projects with ecosystem-serving parks and greenways. Together, the balance of urban and open space development helps to satisfy stormwater permit requirements, minimize stormwater engineering project costs, and provide economically valuable green space.

Figure 9.6. Neighborhood vegetated swale, Village Homes, Davis, California.

Urban green spaces provide outdoor environments that counter-balance the intensity of urban landscapes. Green spaces are venues for community and watershed stakeholders to learn and build relationships. Parks and greenways contribute to sense of place and community and provide opportunities for diverse forms of recreation that can range from farmers markets to ball games and other types of civic activities. When distributed throughout the urban environment, greenways connect people to parks, offer alternative modes of transit, and improve access for park-starved communities.

Figure 9.7 Streambed swale, Jeffrey Open Space Spine, Irvine.

To successfully achieve the hydrologic, social, and economic benefits of neighborhood parks and greenways, local planners, engineers, urban designers, and architects can recommend the daylighting of underground creeks and storm drains as creeks or drainage swales, creation of open space standards to allow equitable access to parks, creation of habitat connections, utilization of native or non-invasive drought tolerant plants and strategies to capture, treat, and infiltrate stormwater where feasible.

Site Scale

Because private property (individual homeowners, business owners, and municipal agencies, flood control districts, transportation authorities, and utilities) accounts for so much of the land area within the watershed, its impact on the water resources of the region is unavoidable. Therefore, it is important to encourage its use in a way that promotes appropriate hydrologic function for the subwatershed areas without diminishing the social and economic purposes served by private property.

In traditional landscapes, runoff from over-irrigation and wash-down activities typically flows from private property into gutters and storm drains. Watershed-friendly site design now requires that low volumes of water be detained on site. This type of design can be encouraged by providing public education, design guidelines and financial incentives, while codifying it into city and county building codes, zoning ordinances, Local Implementation Plans, the Drainage Area Management Plan and redevelopment guidelines.

At present, Local Implementation Plans are required to implement low impact development (LID) retrofits only on certain types of redevelopment and new development (DAMP). Once a water budget is identified for the Region and the respective planning areas, local land use jurisdictions will also be able to more clearly quantify exactly what kind of hydrologic changes are needed from land owners to support the restoration and integration of the region's water resources. On the supply side, the IRWD tiered-water pricing

SOURCES OF INFORMATION FOR SUSTAINABLE DEVELOPMENT

INTERNATIONAL AND NATIONAL PROGRAMS

- **LEADERSHIP IN ENERGY AND ENVIRONMENTAL DESIGN (LEED)**: – U.S.Green Building Council. **www.usgbc.org**
- **SUSTAINABLE SITES INITIATIVE:** Site design principles and rating system – American Society of Landscape Architects and others. **www.sustainablesites.org**
- **LOW IMPACT DEVELOPMENT (LID):** Stormwater runoff focus. **www.lid-stormwater.net**, **www.epa.gov/owow/nps/lid**, "Rooftops to Rivers": **www.nrdc.org/water/pollution**
- **BETTER SITE DESIGN:** Development principles to protect stream, lakes and wetlands. Website includes a manual and a codes and ordinances worksheet which could be useful for cities in developing Orange County DAMP Local Implementation Plans. **www.stormwatercenter.net**
- **SMART GROWTH:** US Environmental Protection Agency. **www.epa.gov/smartgrowth**
- **TRANSIT-ORIENTED DEVELOPMENT (TOD):** the Center for Transit Oriented Development. **www.reconnectingamerica.org**
- **FORM-BASED CODES:** A smart growth movement to reform design codes. Form-based codes emphasize performance of the built environment over land use. **www.formbasedcodes.org**
- **GREENSCAPES:** Landscaping guidelines to help preserve natural resources and prevent waste and pollution. U. S. Environmental Protection Agency. **www.epa.gov/greenscapes**
- **GREEN ROOFS FOR HEALTHY CITIES:** Non-profit, dedicated to increasing awareness of economic, social, and environmental benefits of green roof infrastructure and advancing development of the market for green roof products and services. **www.greenroofs.org**
- **BEST MANAGEMENT PRACTICES (BMPS):** Site and neighborhood scale design elements for reducing stormwater and construction runoff and erosion problems. Many websites and manuals. California Stormwater Best Management Practice Handbooks: **www.cabmphandbooks**

REGIONAL AND LOCAL PROGRAMS

- **ORANGE COUNTY DRAINAGE AREA MANAGEMENT PLAN (DAMP)**, & associated **LOCAL IMPLEMENTATION PLANS (WQMP)** adopted by each city: Includes site-design regulations adopted by the county and cities for new construction and redevelopment projects, for the purpose of decreasing stormwater runoff and pollution. 2003 **www.ocwatersheds.com/StormWater/documents_damp.asp**
- **CALIFORNIA SMART GROWTH INITIATIVE:** Urban Land Institute **www.uli.org**
- **SUSTAINABLE TRAVELWAYS, 'GREEN STREETS' GUIDELINES:** City of Irvine Redevelopment Agency. Sustainable street design for the Great Park and adjacent Heritage Fields development. **www.ci.irvine.ca.us/depts/redevelopment/sustainable_travelways.asp**
- **GREEN HOME:** Green building design for affordable housing. **www.greenhome.org**
- **"CALIFORNIA-FRIENDLY" PLANT LISTS:** List of drought tolerant and native plants compiled by Metropolitan Water District and nursery industry. **www.bewaterwise.com**

Figure 9.8 Non-invasive drought-tolerant garden. (Source: Roger's Gardens)

Figure 9.9 "California Friendly" Garden contest winner, 2007. California native plants plus Mediterranean climate-adapted plants. (Source: Roger's Gardens)

system is one example of institutional support for increased water use efficiency.

Each site ideally would be designed to support the ecosystem needs identified for the local neighborhood, which would in turn support regional processes. Some sites are on soils that allow effective groundwater recharge and some are not. Some areas have a big problem with selenium in the groundwater (e.g., Swamp of the Frogs in Tustin and Irvine) and some areas have significant erosion issues. Some high density or problem areas may need to look at a neighborhood scale solution instead. Different site design approaches will be appropriate in each of these different situations. The watershed advocates and stakeholders in each of the six planning areas will be able to develop mapped information to guide local site design recommendations.

There are some general design principles identified by The Charter for the New Urbanism for the site scale:

1. Architecture and landscape design should grow from local climate, topography, history, and building practice.
2. All buildings can provide their inhabitants with a clear sense of location, weather and time. Natural methods of heating and cooling can be more resource efficient than mechanical systems.
3. Preservation and renewal of historic buildings, districts, and landscapes affirm the continuity and evolution of urban society.

Other universally appropriate site-scale strategies decrease the volume, velocity and pollution of urban runoff and conserve water, energy and habitat. These include:

- Minimize the amount of impervious cover for roads, parking lots, driveways, sidewalks.
- Retain, detain, filter, infiltrate and/or store runoff on site.
- Allow for non-invasive vegetated greenway buffers along streams and channels.
- Encourage infill and 'brownfield' redevelopment, including densely clustered multi-use development near transit centers and away from flood plains.
- Conserve water and energy through use of native and non-invasive drought tolerant landscaping that requires minimal to no irrigation.
- Use locally native plants and locally available or recycled hardscape materials.
- Minimize landscape irrigation, fertilization, and pesticide use.

These kinds of activities may increasingly become a part of our legal structure. For example, the Regional Water Quality Control Boards will soon be requiring low impact development (LID) site design practices through the NPDES MS4 stormwater permitting process. LID is a set of design strategies for site planning and engineering that maintains or restores the pre-development hydrologic regime of urban watersheds. It deals with the way runoff is handled on-site.

In addition, State Assembly Bill AB 1881 requires local jurisdictions to adopt a water-efficient landscape ordinance that is at least as effective as the State Model Water-efficient Landscape Ordinance, by 2010. Water-efficient landscapes reduce water supply needs by using climate-adapted plants with minimal irrigation needs and by utilizing efficient irrigation technology, including weather-based controllers. Note: At present (summer, 2009) MWDOC, the Orange County Division of the League of California Cities and municipal, county and agency stakeholders are drafting a county-wide Model Water-efficient Landscape Ordinance to comply with AB 1881.

Within the past few years, several comparative studies have been conducted around the country to measure the effectiveness of various LID best management practices (BMPs) in terms of volume of runoff prevented and pollutant concentrations in runoff. One such study in Connecticut, comparing three neighborhoods with traditional, control and LID designs, found significant reductions in peak flow volume of runoff and in amounts of various runoff pollutants from the LID development, as compared with the traditional development (Bedan, et. al., 2009). It should be noted that the neighborhoods were located over well-draining soils that allowed effective infiltration.

Both LID and water conservation can be integrated into site designs in a way that adds value to the site. Attractive seasonal water features with native and non-invasive drought tolerant landscapes can be designed that require little fertilizer, pruning or pesticides. Dry streams, ponds, boulders and local California native plants create a

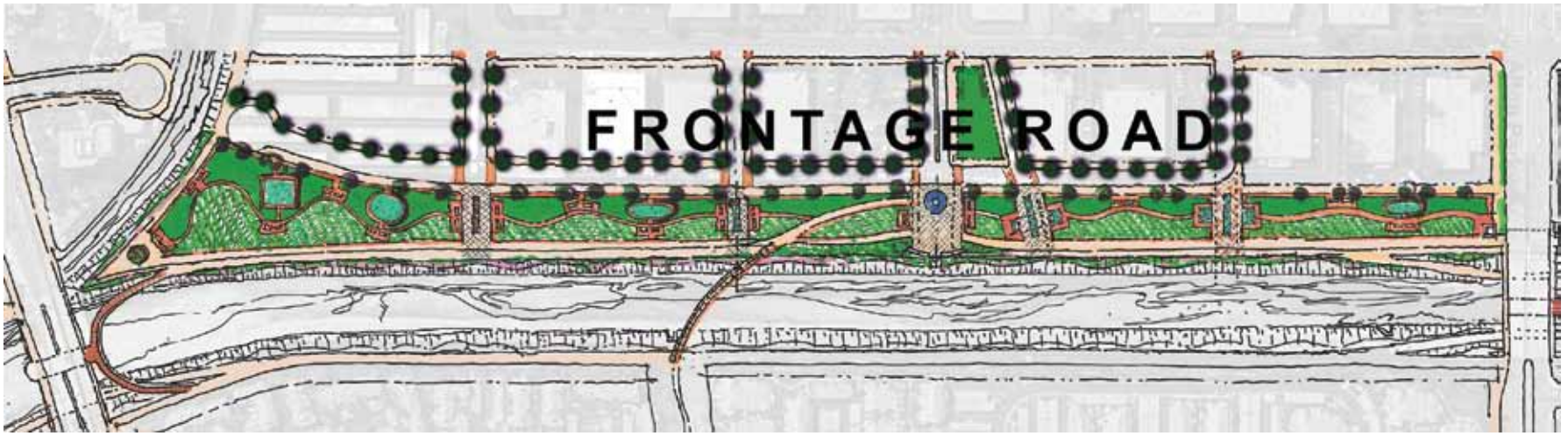

Figure 9.10 Irvine Business Complex proposed "Creekwalk" , plan view showing vegetated buffer along edge of lower San Diego Creek.

Figure 9.11 Irvine Business Complex proposed "Creekwalk" along lower San Diego Creek at McGaw

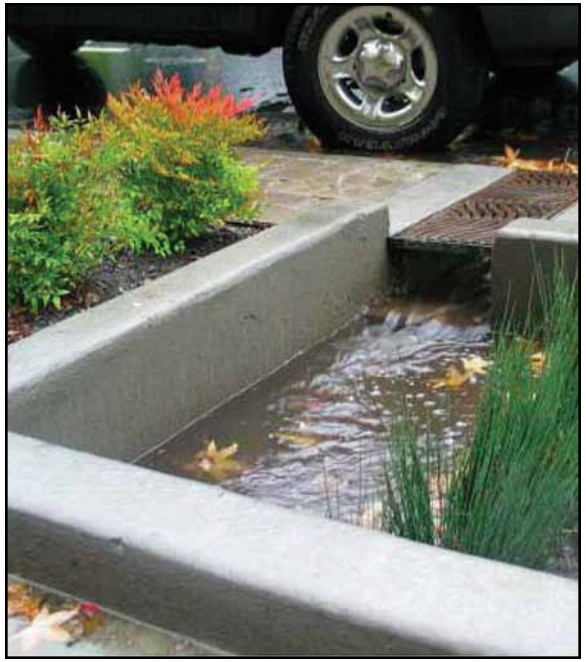

Figure 9.12 Stormwater planter, Portland, Oregon

Figure 9.13 Curb cuts in parking lot median

Figure 9.14 Stormwater collection cells for under parking lots

beautiful natural aesthetic that is unique to this area. During storm events, stormwater can be directed towards 'rain gardens', which serve double-duty as on-site retention and attractive landscape design features. Water is naturally directed to a rain garden because it is located at a low spot on the site. Rain gardens are generally vegetated with drought tolerant plants that can also tolerate short periods of standing water. In some cases, captured stormwater can also be retained for later irrigation. Aside from slowing and retaining stormwater and reducing pollution, this type of landscape also creates a more authentic sense of place.

Fire

UC Berkeley fire expert, Jon E. Keeley, and others conclude that periodic massive wildland fires have always been and always will be a part of life in Southern California. The best way to live with them is to plan and engineer for them in the same way as for earthquakes. Examples of such planning are to avoid inter-fingering development and wildlands and to use irrigated parks or golf courses as buffer zones. Municipalities are also increasingly requiring that urban areas near large open spaces fireproof themselves to reduce the chance for damage when fire does inevitably occur. "According to State Fire Marshal Kate Dargan, fire and building code changes that took

Figure 9.15 Green roof at Ford Premium Automotive Headquarters, Irvine

effect January 1, 2008, are designed to reduce fire risk by requiring that new construction include fire- retardant building materials and design elements, such as enclosed eaves that prevent sparks from flying into attic." Steven Quarles, of the U.C. Berkeley fire lab, notes that 60-70 percent of wildfire risk in California's existing wildland-urban interface (WUI) is found in structural vulnerability to embers, hot air/wind, or direct flame impingement. Thus, much of the risk can be reduced by retrofitting existing structures, eliminating flammable structures and maintaining plantings within yards. Houses (which are dry) burn more easily than irrigated landscaping (which is wet). Tile roofs alone are not sufficient for fire resistance. A house should also have fire-resistant siding, enclosed eaves, screened attic vents and dual pane tempered glass windows, as well as fences, outbuildings and enclosed decks made with fire-resistant materials.

Providing wide enough roads for rapid evacuation access at the same time that the fire engines are entering is also important. According to Pasadena Fire Chief Dennis Downs, "What we're still facing as fire service professionals are areas in our communities that have limited access and high brush areas; these are older neighborhoods with narrow streets and homes built in the wildland-urban interface, where development continues." (Hudson, 2008) Wide enough primary access roads and the aforementioned issues can be included in the zoning and building codes for areas adjacent to open spaces that are prone to fire. If trying to reduce impervious surface area at the same time, modular support technologies are available that allow fire trucks to drive on vegetated or gravel shoulders.

Regarding the role of planning, Dargan states, "At this point in time, there is only one generic document in the land use planner's toolbox that speaks to the General Plan and wildfires; it's a great first-generation document, but it isn't very specific in terms of fire.

There are no guidance documents for fire protection plans or zoning guidance for subdivisions; there are no infrastructure checklists. For the planning profession, there are few if any educational materials that explain how to do a plan review with respect to fire. We need to develop some type of certification to offer land use planners in this area." (Hudson, 2008)

9.2 Environmental Justice

Wealth gravitates to places with well kept amenities. On the other hand, ugly, unhealthy or blighted conditions in a community can scare investment away and devalue surrounding property.

Larger scale blight can drive down property values, which can be a silver lining for finding affordable housing. However, living in a blighted community can perpetuate financial hardship, long-term poverty and inhibit social mobility. These areas may have problems associated with higher crime rates, lower accessibility to adequate services, fewer jobs with growth potential, and increased pollution and health hazards. Any one of these things, but especially a combination of them, can impact a person's ability to get an education, work and accrue wealth. According to the Environmental Justice Coalition for Water, a community becomes disadvantaged as a whole when low overall wages cause the median income to fall below 80 percent of the state-wide median income (Thirsty for Justice, 2005). Within our watershed there are a few areas in the City of Santa Ana and student housing areas around

Figure 9.16 Blight

UCI that fit under this designation (See Figure 3.4). Promoting good community design in our watershed will provide opportunities to reverse economic downward spirals that, not only impact our economically disadvantaged areas, but also neighboring areas.

The IRCWMP's environmental, social and economic goals represent the three elements of a sustainable society, as it is commonly defined by the United Nations' Brundtland Commission Report (1987) . Each of these elements impacts the others to influence the overall vitality of a community. Community blight is a symptom that these elements are working against each other and can be an early warning sign of future decline. The IRCWMP can have a meaningful impact on the overall quality of life in disadvantaged communities by reversing some of these relationships and by implementing environmental projects that support social and economic needs.

Figure 9.17 Lively urban area — The Spectrum, Irvine

Figure 9.18 Lively urban area — Santa Ana

Disadvantaged communities in Southern California are often park-poor and suffer from a lack of amenities in general, because cities view these as a drain on limited funds when there are other basic needs like roads, schools, and police that are already under-funded. Open spaces that are designed to serve an ecological function become eligible for a variety of outside funding sources and partners. If integrated properly with urban planning in the area, these spaces can also provide a financial opportunity by anchoring economic development (Thirsty for Justice, 2005). Urban design often focuses on the technical and functional aspects of a place, at the expense of the less quantifiable experience of making it a more humane place to be. A "humane metropolis" is created, not with a concrete jungle of endless buildings and roads, but rather, by interweaving greenery and public spaces into urban communities. Developers spend a lot of money to hire landscape architects to create this kind of atmosphere within their projects because it attracts customers as more people-friendly. Cites can attract developers and businesses using this same strategy on a larger scale.

The City of Santa Ana has few remaining vacant areas that can be developed as parks. As an alternative, street and property lot landscaping can provide some relief. Along these lines, Southern California Edison and the non-profit Shadetree Partnership have tree-planting programs that also reduce energy needs associated with cooling and heating.

Sometimes urban revitalization is complicated by the presence of hazardous soil contamination. Toxic pollution creates both physical

and economic liabilities. Abandoned gas stations are a prime example of pollution leading to long-term disinvestment because no one wants to take on the liability involved in clean-up. Beneficial ecosystem function can be incorporated into all redevelopment plans, but in the case of brownfields, it is an absolute prerequisite to attracting any kind of future investment. These places need well orchestrated efforts on the part of a number of supporting agencies to remediate the contamination and then integrate the land back into the community. In areas that are especially built out or blighted, brownfields pose an opportunity to create pocket parks and neighborhood green spaces to address environmental justice in two ways: one, by eliminating a local health hazard, and two, by bringing opportunities for active or passive recreation into places that urgently need them.

With access to regional parks, neighborhood parks, and greenways, people can access and enjoy active lifestyles. If there are no recreational areas nearby, or if they are not safe to visit, residents are discouraged from being active. Outdoor activities can help to prevent or treat health problems exacerbated by car-centric development patterns. The social and financial costs of obesity, hypertension, diabetes, cancer, and other health problems can be greatly diminished if people are regularly walking, biking, playing games and engaging in other forms of exercise. Exercise is also good for emotional well-being by balancing the stressors of urban life and providing a sense of calm. In less affluent neighborhoods, people often cannot afford gym memberships; thus, outdoor amenities such as soccer fields or walking trails become even more important in these areas.

Reducing health problems in the population increases productivity at work and decreases the amount of personal, employer and public sector expenses devoted to medical care. Because of this, any organization dedicated to dealing with the health problems of a community has a vested interest in more active lifestyles. In fact, the public health sector has begun to advocate more and more for community design that supports it. These groups and foundations can be brought in as potential partners and funders for these kinds of open space projects.

One of the largest expenses businesses face is health care for their employees. Therefore, they also have a vested interest in a workforce that stays healthy and physically fit. This makes them another potential partner and sponsor for some aspect of open space projects in local communities. Business organizations, such as Chambers of Commerce, may have an interest in facilitating these kinds of partnerships. It provides an opportunity for businesses to demonstrate their support for the community, while it also saves them money to have employees who are more productive on the job, or customers with more disposable income due to fewer medical expenses.

Bikeways and greenway trails can become transportation and movement corridors for people walking and using bikes. The Southern California climate couldn't be better suited for it.

The Orange County Parks Strategic Plan makes note of these opportunities in its Access and Connections goal. Transportation agencies also support alternative transportation modes and are additional future partners for these projects, especially if they connect areas of increased density and traffic congestion. This could lessen the need for cars, roads and other high-impact transportation modes that perpetuate environmental injustice.

The future of local watershed planning will rely in part on 'home-growing' our own planners, ecologists, engineers and scientists. As one of the most proactive water resource programs for urbanized areas on the West Coast, our watershed provides some unique opportunities to provide high school students with on-site, advanced science training. One proposed pilot project includes supplementing selected Environmental Science high school classes with site visits and special field studies to Newport Bay and the coastal canyons of Newport Coast. Successful students interested in pursuing environmental sciences could matriculate to a watershed oriented course of work at UCI.

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